

**U. S. DEPARTMENT OF ENERGY
WORK BREAKDOWN STRUCTURE DICTIONARY
PART II - ELEMENT DEFINITION**

1. PROJECT TITLE/PARTICIPANT Environmental Management/Paducah Remediation Services, LLC (PRS)		2. DATE 6/29/07	3. IDENTIFICATION SITE Paducah Project DOE Portsmouth/Paducah Project Office (PPPO)
4. WBS ELEMENT CODE 04.11.01.02		5. WBS ELEMENT TITLE Dissolved-Phase Plume	
6. INDEX LINE NO. N/A	7. REVISION NO. AND AUTHORIZATION Rev 1		8. DATE 6/24/2008
9. APPROVED CHANGES N/A			
10. SYSTEM DESIGN DESCRIPTION N/A		11. BUDGET AND REPORTING NUMBER N/A	
12. ELEMENT TASK DESCRIPTION			
<p><u>WBS STRUCTURE</u></p> <p>The scope of this element includes the following sub-elements:</p> <ul style="list-style-type: none"> • WBS 04.11.01.02.01 Dissolved-Phase Plume Subproject Management • WBS 04.11.01.02.02 Dissolve Phase Plume Work Plan • WBS 04.11.01.02.05 Groundwater Modeling Support • WBS 04.11.01.02.06 Remedial Investigation • WBS 04.11.01.02.07 Kentucky Research Consortium for Energy and Environment (KRCEE) Degradation Sampling <p><u>INTRODUCTION</u></p> <p>Three trichloroethene (TCE) dissolved-phase plumes are present at Paducah Gaseous Diffusion Plant (PGDP). They are the Northwest (NW) Plume, Southwest (SW) Plume, and Northeast (NE) Plume. The major contaminant of concern in all three plumes is TCE. The dissolved-phase plumes are generated by the dissolving of source areas at PGDP that contain nonaqueous phase TCE more commonly referred to as dense nonaqueous-phase liquid (DNAPL).</p> <p>MNA is a risk management strategy for remediation of groundwater contaminant plumes that relies on intrinsic degradation or bioremediation and other contaminant concentration reduction through physical mechanisms to control exposure to contaminants and to restore the groundwater to beneficial use in the environment. Natural attenuation describes the reduction of contaminant concentrations in groundwater resulting from the combined effects of dispersion, dilution, volatilization, sorption, degradation, and biodegradation. The combined effects of these processes result in a concentration reduction that will restore contaminated groundwater back to its beneficial use over a period of time. Generally, the only process that actually results in contaminant destruction during natural attenuation is intrinsic biodegradation, augmented bioremediation, or abiotic degradation. In the case of PGDP where it may not be feasible to identify a naturally occurring TCE destruction process, augmented bioremediation may be used to support monitored natural attenuation. By augmenting the natural system, we may be able to economically sustain continuous TCE degradation. Continued updating of the groundwater flow and contaminant transport models used to evaluate the groundwater system will be a key component supporting the monitoring and augmentation of a natural system.</p> <p>A report documenting an evaluation of natural attenuation processes was completed in 1997 (reference: KY/EM-113). This study concluded that natural attenuation processes are active and plume attenuation is occurring; however, the rate identified did not appear to be sufficient for MNA to be a viable strategy as a stand-alone remedy for the dissolved NE and NW Plumes. The presence of TCE contaminant degradation also was documented in Appendix F of the D2 Southwest Site Investigation Report issued</p>			

1. PROJECT TITLE/PARTICIPANT Environmental Management/Paducah Remediation Services, LLC (PRS)	2. DATE 6/29/07	3. IDENTIFICATION SITE Paducah Project DOE Portsmouth/Paducah Project Office (PPPO)
4. WBS ELEMENT CODE 04.11.01.02	5. WBS ELEMENT TITLE Dissolved-Phase Plume	
<p>in May 2006. Further additional study is being performed for the site utilizing a TCE Degradation Project Team composed of engineers and scientists from the Kentucky Research Consortium for Energy and Environment, Department of Energy (DOE), U.S. Environmental Protection Agency (USEPA), Commonwealth of Kentucky, and DOE subcontractors including Paducah Remediation Systems, LLC, Northwind Environmental and Navarro Engineering. The additional work is being performed in a study utilizing three stages:</p> <ul style="list-style-type: none">• Enzyme probe analysis for aerobic biodegradation,• Biodegradation testing utilizing Stable Carbon Isotope Ratio Analysis, and• Degradation testing utilizing abiotic degradation of TCE. <p>The enzyme and carbon ratio testing will be performed and analyzed for sufficiency. Abiotic analysis will be planned and performed following negative results for the enzyme and carbon testing.</p> <p>The above testing will be documented in reports developed by the TCE Degradation Project Team. PRS involvement in the report development will include drafting of various background and technical sections and review of the draft report in its entirety. The first is a white paper discussing the results of the TCE degradation study. The second is the summary of the potential for Monitored Natural Attenuation.</p> <p>If the natural attenuation level of activity present in the RGA is determined to be unsuitable to support the remedy selection of monitored natural attenuation alone as a remedy, then additional testing of an enhancement to the degradation will be proposed and evaluated. The enhancement will be the installation and testing of an emulsified vegetable oil treatment zone. If effective, the <i>in situ</i> bioremediation technique will become a portion of the groundwater strategy to support implementation of MNA to demonstrate to the regulatory agencies that an appropriate MNA final remedy for the dissolve-phase TCE contamination plumes can be implemented. The implementation of MNA will provide a basis for allowing DOE to discontinue current operation of the NW and NE Interim Remedial Actions.</p>		
<u>LOGIC RELATIONSHIPS</u>		
Interfaces:		
<u>Internal to PRS:</u>		
<ul style="list-style-type: none">• All PRS project managers and staff• All subcontractors		
<u>External to PRS:</u>		
<ul style="list-style-type: none">• DOE Portsmouth/Paducah Project Office (PPPO) and support contractors• DOE Headquarters or other DOE sites (if applicable)• EPA• Commonwealth of Kentucky (KY)• Site tenants including United States Enrichment Corporation (USEC); Uranium Disposition Services, LLC; and Swift & Staley Team (SST)• USEC services in the area of property, information technology, radios, etc.• SST, particularly in the areas of property management, information technology, and security.• Nevada Test Site (NTS): Profiling and disposition of newly generated and classified and fissile low-level waste (LLW), if required or applicable.• EnergySolutions: Profiling, treatment, and disposition of mixed and LLW, if required or applicable.• Toxic Substances Control Act (TSCA) Incinerator, if required or applicable.• Commercial treatment, storage, and disposal facility (TSDF): For treatment and disposal of non-radioactive hazardous waste, if required or applicable.• KRCEE		

1. PROJECT TITLE/PARTICIPANT Environmental Management/Paducah Remediation Services, LLC (PRS)	2. DATE 6/29/07	3. IDENTIFICATION SITE Paducah Project DOE Portsmouth/Paducah Project Office (PPPO)
4. WBS ELEMENT CODE 04.11.01.02	5. WBS ELEMENT TITLE Dissolved-Phase Plume	
<ul style="list-style-type: none">StakeholdersCitizens Advisory Board and supporting contractor Edward Holmes, Inc.DOE Integrated Safety Management System (ISMS) Verification TeamOther nonregulatory key interfaces		
Time Sequencing with Other Work: <ul style="list-style-type: none">Subproject management - concurrent with activities related to the implementation of the C-400 remedial action. The purpose of this is to allow the signing of the Record of Decision (ROD) for the Dissolved-Phase Plumes after the completion of the interim remedial action of C-400.The TCE Degradation Project Team Study includes the coordination with the team members of the interagency project team. The members included DOE, EPA, Commonwealth of Kentucky, KRC Energy and Environment and DOE subcontractors. The study includes the performance of degradation studies in 3 stages including:<ul style="list-style-type: none">TCE degradation analysis utilizing enzyme probes,TCE degradation analysis utilizing stable carbon isotope ratio characteristics, andTCE degradation thru abiotic means.The studies will conclude with the development of a White Paper discussing the testing findings and the likely application to the implementation of degradation on the dissolve phase plumes.A Monitored Natural Attenuation Evaluation Report is planned following the completion of the TCE natural degradation studies under the KRCEE. The MNA Evaluation report will evaluate technically, regulatorily and strategically the acceptability of implementing a remedial measure of monitored natural attenuation on the Dissolve-Phase Plumes. Should the natural degradation of the TCE be insufficient to support the remedy, then a treatability study utilizing an emulsified vegetable oil treatment zone may be recommend and performed under a separate element of this WBS.The Dissolved-Phase Remedy Work Plan, field evaluation, and summary report preparation are stand-alone tasks that will not require significant coordination or sequencing with other projects except for the C-400 Source Action and the SW Plume. The success of the C-400 work will have a direct impact on the ability to implement a selected alternative on the dissolved-phases. The completion of the SW Plume WBS element will have an impact on the ability to perform acceptable groundwater modeling since TCE degradation is the limiting component for the SW Plume.It will be necessary to coordinate the schedule for natural attenuation sampling associated with the bioremediation treatability study with the sitewide compliance sampling schedule so that the time between sampling events is adequate and to ensure samples are representative.The dissolved-phase remedy evaluation must be substantially complete before initiation of Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) decision document preparation.The updating of the groundwater models utilized to determine fate and transport of contaminants from the site to off-site locations is also necessary to support a dissolved-phase plume remedy.		
<u>SCOPE DESCRIPTION</u>		
WBS 04.11.01.02.01 Dissolve-Phase Plume Subproject Management Provide overall management activities associated with this subproject. Activities performed under this subelement include the following: <ul style="list-style-type: none">Perform technical, contractual and project functions necessary to effectively manage and report scope, schedule, and budget.Maintain all activities within the defined safety, environmental, and quality requirements.Perform technical and personnel management functions.Maintain technically qualified and properly trained personnel.		

1. PROJECT TITLE/PARTICIPANT Environmental Management/Paducah Remediation Services, LLC (PRS)	2. DATE 6/29/07	3. IDENTIFICATION SITE Paducah Project DOE Portsmouth/Paducah Project Office (PPPO)
4. WBS ELEMENT CODE 04.11.01.02	5. WBS ELEMENT TITLE Dissolved-Phase Plume	
<ul style="list-style-type: none">• Develop, evaluate, and report project performance metrics.• Interface with DOE, KY, EPA, other prime contractors, and stakeholders, as needed. <p>The method(s) used for determining earned value for this WBS element is Level of Effort.</p>		
WBS 04.11.01.02.02 Dissolved-Phase Plume Work Plan <p>A treatability study work plan will be developed for implementing testing to facilitate the selection and implementation of the Dissolved-Phase Plumes Remedy. In this baseline the work plan will only be developed to the D0 level. The remaining required efforts will be performed under the outyears baseline. The following text is provided to provide clarity in the technical approach to be utilized in preparing the work plan and the review of the its remaining versions.</p> <p>A technical ‘desktop’ study will be used to evaluate the degradation capacity in the Regional Gravel Aquifer (RGA), and the most likely bioremediation technology or bioaugmentation technology to be successful in the PGDP groundwater environments will be included in this phase of work. The ‘desktop’ study will be performed in an ‘Innovative Technology Remediation Deployment’ fashion. It will utilize a team of subject matter experts in the field of MNA, bioremediation, and general groundwater remediation and all previous attenuation material developed such as the KRCEE White Paper. The subject matter experts, for example, will represent DOE and EPA national laboratories, academia, and private contractors. The purpose of the ‘desktop’ study will be to assess the existing PGDP information and to allow the subject matter experts to evaluate the information and to assist in developing an implementation path forward that will have the greatest likelihood of generating acceptance of a MNA remedy. A demonstration to determine the effectiveness of the technology most likely to be successful (such as an emulsified oil biobarrier, or cometabolic bioremediation, or bioaugmentation materials) will be proposed. If successful, the technology likely will be proposed to augment MNA as a potential final remedy for the dissolved-phase plumes. Emulsified oil biobarriers are low-cost, permeable reactive barriers (PRBs) that promote the biodegradation of contaminants as groundwater flows through the barrier. The oil biobarrier functions in the same manner as other TCE targeting PRBs such as mulch and/or zero valiant iron walls that typically are installed for shallow aquifer treatments using trenching technologies. This element will be complete upon the issuance of the D1 Treatability Study Work Plan to the regulators for review.</p> <p>The method(s) used for determining earned value for this WBS element is Percent Complete.</p>		
WBS 04.11.01.02.05 Groundwater Modeling <p>Groundwater modeling is an essential component in supporting a remedial decision for the dissolve-phase plumes and the Burial Grounds Operable Unit (BGOU). Any remedial decision selection will require an understanding of the fate and transport of the TCE or other contaminant over time. In order to effect this determination, the existing groundwater models which were last updated in 1999, will be updated to include new information that has been collected since that time and to take advantage of increased efficiency in electronic computing power. This update will include the following tasks:</p> <ul style="list-style-type: none">• Groundwater Model Transition and Review• Evaluation and Data Evaluation of Existing Groundwater Model• Groundwater Flow Model Update<ul style="list-style-type: none">○ Flow Model Configuration Revision○ Flow Model Calibration○ Paducah Flow Evaluation and Sensitivity Analysis• Transport Model Update• Groundwater Model Update Report		

1. PROJECT TITLE/PARTICIPANT Environmental Management/Paducah Remediation Services, LLC (PRS)	2. DATE 6/29/07	3. IDENTIFICATION SITE Paducah Project DOE Portsmouth/Paducah Project Office (PPPO)
4. WBS ELEMENT CODE 04.11.01.02	5. WBS ELEMENT TITLE Dissolved-Phase Plume	
<p>This element for groundwater models will not include specific modeling for specific operable units necessary to support specific remedial project decisions. Specific operable unit modeling required to support risk determinations, selection of remedial alternatives, etc., will be performed under the specific WBS project element utilizing the site groundwater model developed under this element. Projects that are expected to utilize this site groundwater model include Dissolve-Phase Plume and BGOU.</p> <p>A sub-element of the groundwater modeling element is the updating and development of the Methods for Conducting Risk Assessments and Risk Evaluations at PGDP. This document originally was developed in 1990s and updated in 2001. Due to changing methods and referenced usage values, the document will once again be updated under this dictionary. The updated document will include the process requirements for performing risk assessments consistent with approved EPA and Commonwealth of Kentucky risk assessment guidance. It will include sections for performing both Human Health and Ecological Risk Assessments. It also will be expanded to prescribe the methods and acceptable processes for including probabilistic analyses in the fate and transport modeling, as well as the exposure modeling. The updating of the existing document will be performed utilizing onboard discussions with the regulators and other applicable stakeholders providing input in a realtime fashion to allow the updating to be streamlined.</p> <p>The development and updating of the PGDP site groundwater contaminant plume maps is a component of this element. This effort will include the assessment of existing groundwater contaminant data and the development of the contaminant iso-concentration maps for the TCE and technetium-99. The assessment includes the development of a supporting document. A draft and final version are included in the effort. A single review of the draft will be performed by all DOE and contractor interested stakeholders. Following the review of the draft maps and supporting document, the maps and document will be issued as a final. The update is scheduled to be performed on a biennial basis that includes 2007 and 2009.</p> <p>The maps and document are not reviewed by the regulators or outside stakeholders until the final map version is issued. Any comments received from outside reviewers will be incorporated in the next scheduled update of the map and supporting document.</p> <p>The method(s) used for determining earned value for this WBS element is Percent Complete.</p> <p>WBS 04.11.01.02.06 RI/FS Work Plan</p> <p>As a result of negotiations with the USEPA and the Commonwealth of Kentucky on the informal dispute associated with the SW Plume and the 2008 PGDP Site Management Plan, a remedial investigation and feasibility study of the Dissolved Phase Plumes was included in the project. The actual remedial investigation and feasibility study would be performed under the Outyear Baseline element. The RI/FS Work Plan would be initiated under this baseline element through the issuance of the D0 Scoping Document for legal review to DOE. The remaining activities associated with the scoping document development (D1 issuance, D2 development, etc.) and the complete RI/FS work plan development would be completed under the Outyear Baseline. The RI/FS Work Plan will be developed to be consistent with the PGDP FFA requirements and the USEPA RI/FS Guidance.</p> <p>The RI/FS Work Plan and the supporting scoping document will be developed to support the investigation of the dissolved phases of the three existing PGDP groundwater plumes (NW, NE & SW). The investigation will include collection of data associated with the distal ends of the plumes, the interactions of the plumes with surface water features near the Ohio River and the interaction characteristics with the Bayou and Little Bayou creeks throughout the extent of the plumes. The work plan is expected to contain specific investigation components that include the following</p>		

1. PROJECT TITLE/PARTICIPANT Environmental Management/Paducah Remediation Services, LLC (PRS)	2. DATE 6/29/07	3. IDENTIFICATION SITE Paducah Project DOE Portsmouth/Paducah Project Office (PPPO)
4. WBS ELEMENT CODE 04.11.01.02	5. WBS ELEMENT TITLE Dissolved-Phase Plume	
<p>areas/systems:</p> <ul style="list-style-type: none">• Southwest Plume Distal End Monitoring Well System• Terrace, RGA and Creek Interface Well System• Northwest Plume Distal End Monitoring Well System• Northeast Plume Distal End Monitoring Well System• Carbonate Rubble Zone MW System• Northwest Plume Contaminant Migration Transects• Creek Nests and Gauging MW System• Little Bayou Creek/RGA Interaction Analysis• NE Plume Upgradient Analysis• C-616 Lagoon Monitoring System• Northwest Centerline Well System• Northeast Centerline Well System• Ohio River/RGA Interface System <p>The method(s) used for determining earned value for this WBS element is Percent Complete.</p>		
<p>WBS 04.11.01.02.07 KRCEE Degradation Sampling</p> <p>As a result of comments received on the utilization of TCE degradation factors in groundwater modeling supporting the project, the TCE Degradation Project Team was developed to perform a study of the potential degradation mechanisms in the Upper Continental Recharge System (UCRS) and Regional Gravel Aquifer (RGA). The TCE Degradation Project Team Study includes supporting activities for the team members of the interagency project team. The members included DOE, U.S. EPA, Commonwealth of Kentucky, KRCEE, and DOE subcontractors. KRCEE is the principal coordinator of the study's activities. PRS supports the studies through the assistance of sampling efforts, technical assistance, laboratory and field analytical work, and field investigation work as necessary. The study includes the performance of degradation studies in 3 separate stages including:</p> <ul style="list-style-type: none">▪ TCE degradation analysis utilizing enzyme probes,▪ TCE degradation analysis utilizing stable carbon isotope ratio characteristics, and▪ TCE degradation thru abiotic means and microcosm analysis. <p>The studies will conclude with the development of a White Paper by the project team including PRS' contributions discussing the testing, findings, and the likely application to the implementation of degradation factor on the groundwater and dissolve-phase plumes.</p> <p>The method(s) used for determining earned value for this WBS element is Percent Complete.</p>		
<p><u>DELIVERABLES</u></p>		
<p>WBS 04.11.01.02.01 Dissolved-Phase Plume Subproject Management</p> <p><u>Element Milestones</u></p> <ul style="list-style-type: none">• None <p><u>Element Deliverables</u></p> <ul style="list-style-type: none">• Paducah PRS Quality Assurance (QA) Project Plan• Paducah PRS Environmental Safety & Health (ES&H) Plan• Provide input to the following reports and submittals (if applicable):<ul style="list-style-type: none">○ Monthly Project Performance Report (PPR)○ Risk Management Plan Updates		

1. PROJECT TITLE/PARTICIPANT Environmental Management/Paducah Remediation Services, LLC (PRS)	2. DATE 6/29/07	3. IDENTIFICATION SITE Paducah Project DOE Portsmouth/Paducah Project Office (PPPO)
4. WBS ELEMENT CODE 04.11.01.02	5. WBS ELEMENT TITLE Dissolved-Phase Plume	
<ul style="list-style-type: none">o Site Management Plan (SMP)o Solid Waste Management Unit (SWMU) Assessment Reporto Semiannual Critical Analysis Reporto Presentationso Federal Facility Agreement (FFA) briefingso Labor determinationso Gold Chart Performance Metricso Annual updates to Site Treatment Plano Annual Compliance Agreement Reporto Annual ISMS Updateo Annual Work Smart Standards Updateo Financial Reporting, Management Analysis Reporting Systemo Annual Statement of Costs Incurred and Claimedo FFA Semiannual Progress Reporto Remedial Action/Regulatory Commitment Tracking Reporto Other reports/documents, as necessary		
WBS 04.11.01.02.02 Dissolved-Phase Plume Work Plan <u>Element Milestones</u> <ul style="list-style-type: none">• None <u>Element Deliverables</u> <ul style="list-style-type: none">• Dissolved-Phase Plume Work Plan, D-1 and D0		
WBS 04.11.01.02.05 Groundwater Modeling <u>Element Milestones</u> <ul style="list-style-type: none">• None <u>Element Deliverables</u> <ul style="list-style-type: none">• Groundwater Modeling Update Report• Risk Methods Document (Draft and Final for Human Health and Ecosystem combined.)		
WBS 04.11.01.02.06 RI/FS Work Plan <u>Element Milestones</u> <ul style="list-style-type: none">• None <u>Element Deliverables</u> <ul style="list-style-type: none">• RI/FS Work Plan Scoping Document, D-1 and D0		
WBS 04.11.01.02.07 KRCEE Degradation Sampling <u>Element Milestones</u> <ul style="list-style-type: none">• None <u>Element Deliverables</u> <ul style="list-style-type: none">• None		

1. PROJECT TITLE/PARTICIPANT Environmental Management/Paducah Remediation Services, LLC (PRS)	2. DATE 6/29/07	3. IDENTIFICATION SITE Paducah Project DOE Portsmouth/Paducah Project Office (PPPO)
4. WBS ELEMENT CODE 04.11.01.02	5. WBS ELEMENT TITLE Dissolved-Phase Plume	
<u>REQUIREMENTS</u>		
<ul style="list-style-type: none">• CERCLA/National Contingency Plan• KY Hazardous Waste Permit (KY8-890-008-982)• FFA for PGDP• SMP for PGDP (annual revisions)• Applicable state and federal laws and regulations (applicable or relevant and appropriate requirements)• PRS ISMS• UEO-1066, as updated - Lease Agreement between DOE and USEC, Revision 4, dated October 30, 2001• Enclosure to GDP 95-0018, as updated - USEC and DOE Resolution of Shared Site Issues, Revision 1, dated March 30, 1998• Applicable PRS plans, policies and procedures.• Waste Acceptance Criteria for all applicable treatment and disposal facilities that were in effect on April 24, 2006.• Applicable DOE Orders• Applicable Federal Acquisition Regulations		
<p>It is the core value of PRS that the safety and health of every worker, the public at large, and our environment are the most important assets that we are entrusted to protect. To accomplish this, an ISMS, based on DOE's ISMS, has been implemented that incorporates the five core functions and is based on the seven guiding principles. The objective of ISMS is to systematically integrate safety and environmental protection into the planning and execution of all work activities. The term safety encompasses Nuclear Safety, Industrial Safety, Industrial Hygiene, Occupational Health, Health Physics, and environmental issues. ISMS requirements flowdown to PRS subcontractors. The five core functions are (1) define the scope of work, (2) analyze hazards, (3) develop and implement hazard controls, (4) perform work within controls, and (5) provide feedback and continuous improvement. The seven guiding principles are (1) line management responsibility for safety, (2) clear roles and responsibilities, (3) competence commensurate with responsibility, (4) balanced priorities, (5) identification of safety standards and requirements, (6) hazard control tailored to work being performed, and (7) operations authorization.</p>		
<p>Before a subproject begins, several activities must be completed that demonstrate that all involved in the project have completed rigorous health and safety reviews and that all potential hazards of doing the work have been identified. The routine activities in remedial actions are conducted in accordance with standard operating procedures, activity hazard analyses, and Integrated Safety Management plans. Non-routine work will require a readiness assessment, as necessary, to ensure complete health, safety, and environmental reviews prior to work start. This assessment is conducted by people experienced in similar kinds of work with the right to examine all aspects of a project about to commence and requires that the project team provide documented evidence that any applicable requirements of the job have been met.</p>		
<u>SCOPE ASSUMPTIONS</u>		
<ul style="list-style-type: none">• Additional groundwater fieldwork (sampling) will be completed using inhouse existing Environmental Monitoring and Reporting resources and schedules; sampling and analysis/validation costs will be incurred by this subproject.		

1. PROJECT TITLE/PARTICIPANT Environmental Management/Paducah Remediation Services, LLC (PRS)	2. DATE 6/29/07	3. IDENTIFICATION SITE Paducah Project DOE Portsmouth/Paducah Project Office (PPPO)
4. WBS ELEMENT CODE 04.11.01.02	5. WBS ELEMENT TITLE Dissolved-Phase Plume	

COMPLETION CRITERIA

Completion of the Dissolved-Phase Plume will be considered complete for the PRS contract when the following steps have been completed:

- **WBS 04.11.01.02.01 Dissolved-Phase Plume Subproject Management**
 - Completion of all supporting subproject management document and reporting requirements as listed in the Scope Description section as listed above.
- **WBS 04.11.01.02.02 Dissolve Phase Plume Work Plan**
 - The development and submission of the D1 work plan to the regulators.
- **WBS 04.11.01.02.05 Groundwater Modeling Support**
 - Completion of all supporting sampling and analysis for the TCE Degradation Study Project Team has been completed.
 - Completion of the update Risk Methods Document (Human Health and Ecological) and acceptance by the regulators.
 - Development of the PGDP Groundwater Contaminant Plume Maps for Tc-99 and TCE in the years 2007.
- **WBS 04.11.01.02.06 RI/FS Work Plan**
 - Development and submission of the D0 remedial investigation work plan scoping document
- **WBS 04.11.01.02.07 KRCEE Degradation Sampling**
 - Completion of all supporting sampling and analysis for the TCE Degradation Study Project Team has been completed.

RISK MANAGEMENT

See Risk Management Plan for analysis.

Risk was mitigated through the following efforts:

- Continue to perform due diligence to ensure that waste is properly packaged and that transportation conveyances are properly loaded.
- Continue to perform due diligence in all work activities to reduce the possibility of safety incidents.
- DQOs will have qualitative and quantitative statements derived from the DQO Process that clarify study objectives, define the appropriate type of data, and specify the tolerable levels of potential decision errors that will be used as the basis for establishing the quality and quantity of data needed to support decisions and process knowledge.
- Follow waste characterization and packaging procedures and plans.
- Ensure that documents are written professionally and accurately.

1. PROJECT TITLE/PARTICIPANT Environmental Management/Paducah Remediation Services, LLC (PRS)	2. DATE 6/29/07	3. IDENTIFICATION SITE Paducah Project DOE Portsmouth/Paducah Project Office (PPPO)
4. WBS ELEMENT CODE 04.11.01.02	5. WBS ELEMENT TITLE Dissolved-Phase Plume	

CERCLA AREAS AND SWMU

SWMU No.	Description
201	Northwest Groundwater Plume
202	Northeast Groundwater Plume
210	Southwest Groundwater Plume

BASIS OF ESTIMATE

1. Summary of Site Conditions
The Dissolved-Phase Plumes contained in the Regional Gravel Aquifer have been investigated by a number of investigations including the Phase I, Phase II, Phase III, and Phase IV Site Investigations, which were performed between 1988 and 1995. In addition to collecting data and installing monitoring wells in the plumes during these investigations, additional work was executed to characterize the Dissolved-Phase Plumes as part of the Waste Area Group Investigations performed from 1993 to 2000. An Environmental Monitoring Plan has been developed and implemented and is updated on an annual basis that outlines the continued periodic collection of information from the monitoring wells and sampling points in dissolved-phase areas. Two interim remedial actions were implemented in the mid-1990s that have resulted in the reduction of TCE and ⁹⁹T contaminants flowing off DOE property. Additionally, a permeable treatment zone was tested in early 2000, but was not successful due to construction difficulties. A feasibility study developed for the Groundwater Operable Unit in 2001 contained an evaluation of potentially applicable technologies to dissolved-phase plumes. The most recent investigation of the dissolved-phase plumes was the C-746-S & T Landfills and the Southwest Plume Site Investigation in 2004 that assessed the flow of dissolved-phase contaminants in the RGA near the two specific landfills and in the SW Plume area near the SWMU 4 and the plant fence area.

2. Estimating Methods
☐ Parametric ☒ Bottom-Up ☐ Other

3. Sources of Estimating
Labor – Technical review of documents to be prepared determined the mix of labor required for document preparation. Project team meetings were utilized to identify staff types to be used for other areas such as, sample collection and analysis, waste characterization and disposal, health and safety monitoring, etc.

Equipment – Echols & R.S. Means were two printed sources used to determine the types of equipment needed to conduct the work proposed. Experience from technical staff also provided input as to the type of equipment needed. When available, unit price contract amounts were used.

Materials – Same as equipment.
Other Direct Costs – Same as equipment.
Transportation – Same as equipment.
Subcontracts – Same as equipment.

4. Basis of Estimate (Unescalated Values)

1. PROJECT TITLE/PARTICIPANT Environmental Management/Paducah Remediation Services, LLC (PRS)	2. DATE 6/29/07	3. IDENTIFICATION SITE Paducah Project DOE Portsmouth/Paducah Project Office (PPPO)
4. WBS ELEMENT CODE 04.11.01.02	5. WBS ELEMENT TITLE Dissolved-Phase Plume	

WASTE VOLUMES
See attached waste performance metrics, as applicable.

PROJECT SCHEDULE
See attached schedule.

BASELINE BY YEAR
See attached Baseline by Year Report.